

The Neutralized Drift Compression Experiment

M.A. Leitner, A. Anders, F.M. Bieniosek, S. Eylon, W.G. Greenway, E. Henestroza,

B.G. Logan, P.K. Roy, D.B. Shuman, D.L. Vanecek, W.L. Waldron, S.S. Yu, LBNL

D.V. Rose, C. Thoma, D.R. Welch, MRC

R.C. Davidson, P.C. Efthimion, E.P. Gilson, I. Kaganovich, A.B. Sefkow, PPPL

J.J. Barnard, W.M. Sharp, LLNL

The most recent, and highly innovative, proposal for a next, integrated beam experiment in the U.S. Heavy Ion Fusion Virtual National Laboratory (HIF-VNL) is the Neutralized Drift Compression Experiment (NDCX). NDCX will develop novel, still unexplored beam manipulation techniques in order to establish the physics limits on compression of heavy ion beams for creating high energy density matter and fusion ignition conditions. As a major advance for the HIF-VNL, NDCX could also provide significant beam pulse energy on target (10^{11} J/m³).

The main components of NDCX are discussed, in particular a new injector concept, the load-and-fire injector, and the neutralized drift compression section. NDCX will compress the beam within neutralizing plasma, therefore significantly extending the transportable beam current into high-intensity regimes not reachable in the absence of background plasma. To validate these essential components experimentally NDCX will be built in several phases, which are described in more detail.

This work performed under the auspices of the U.S Department of Energy by University of California, Lawrence Livermore and Lawrence Berkeley National Laboratories under contracts No. W-7405-Eng-48 and DE-AC03-76SF00098.